



The
Patent
Office

PRIORITY DOCUMENT

09-101,612
GB97/000095

The Patent Office
Cardiff Road
Newport
Gwent
NP9 1RH

| | |
|-------|-------------|
| REC'L | 03 APR 1997 |
| WIPO | PCT |

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

I also certify that by virtue of an assignment registered under the Patents Act 1977, the application is now proceeding in the name as substituted.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

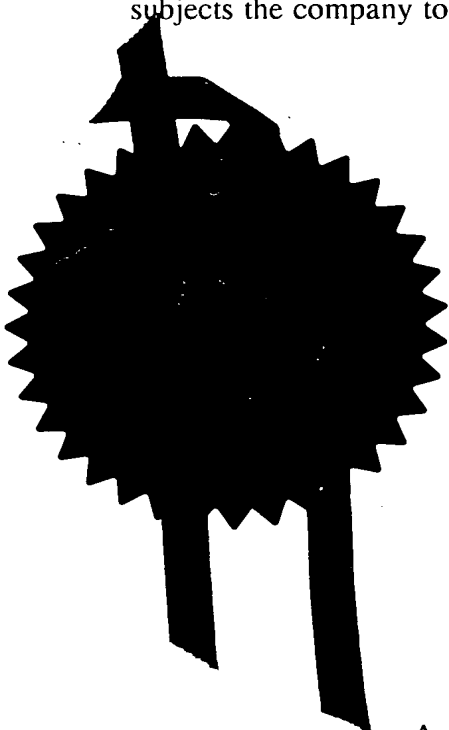
Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.

Signed

Andrews

Dated

19th February 1997





The Patent Office

9600519.4

The Patent Office

By virtue of a direction given under Section 30 of the Patents Act 1977, the application is proceeding in the name of

39 Haldon Road
Newport
South Wales NP9 1RH

Switchboard
01633-814000

Margetson, Guy Edward John
39 Haldon Road
London
SW18 1QF

Hedges, Thomas Andrew
The Huse
1 Mill Lane
South Moreton
Nr Didcot
Oxfordshire
OX11 5EB

Patents Form 1/77

Patents Act 1977
section 16)

The
Patent
Office

11JAN96 E166844-1 002396
P01/7700 25.00

Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form.)

The Patent Office

Cardiff Road
Newport
Gwent NP9 1RH

1. Your reference

6712:ME

2. Patent application number

(The Patent Office will fill in this part)

11 JAN 1996

9600519.4

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Patents ADP number (if you know it)

If the applicant is a corporate body, give the
country/state of its incorporation

GUY EDWARD JOHN MARGETSON
BODO METSCHER
THOMAS ANDREW HEDGES

39 HALDON ROAD, LONDON SW18 1QF,
SUITE 337, 19 OLD COURT PLACE LONDON W8 4TH,
THE HUSE, 1 MILL LANE, SOUTH MORETON,
NR. DIDCOT, OXON OX11 5EB, RESPECTIVELY

4. Title of the invention

VISUAL INFORMATION SYSTEMS

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom
to which all correspondence should be sent
(including the postcode)

SAUNDERS & DOLLEYMORE
9 RICKMANSWORTH ROAD
WATFORD
HERTFORDSHIRE
WD1 7HE

Patents ADP number (if you know it)

6. If you are declaring priority from one or more
earlier patent applications, give the country
and the date of filing of the or of each of these
earlier applications and (if you know it) the or
each application number

Country

Priority application number
(if you know it)

Date of filing
(day / month / year)

7. If this application is divided or otherwise
derived from an earlier UK application,
give the number and the filing date of
the earlier application

Number of earlier application

Date of filing
(day / month / year)

8. Is a statement of inventorship and of right
to grant of a patent required in support of
this request? (Answer 'Yes' if:

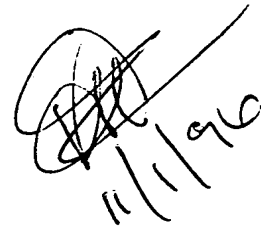
- a) any applicant named in part 3 is not an inventor, or
 - b) there is an inventor who is not named as an applicant, or
 - c) any named applicant is a corporate body.
- See note (d)).

NO

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form.
Do not count copies of the same document

| | |
|----------------------------------|---|
| Continuation sheets of this form | 0 |
| Description | 4 |
| Claim(s) | 2 |
| Abstract | 1 |
| Drawing(s) | 2 |



10. If you are also filing any of the following, state how many against each item.

| | |
|--|---|
| Priority documents | 0 |
| Translations of priority documents | 0 |
| Statement of inventorship and right to grant of a patent (Patents Form 7/77) | 0 |
| Request for preliminary examination and search (Patents Form 9/77) | 1 |
| Request for substantive examination (Patents Form 10/77) | 0 |
| Any other documents (please specify) | 0 |

11. I/We request the grant of a patent on the basis of this application.

Signature

Date

SAUNDERS & DOLLEYMORE

11 JANUARY 1996

12. Name and daytime telephone number of person to contact in the United Kingdom

MIKE ENSKAT

01923 238311

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

- If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.
- Write your answers in capital letters using black ink or you may type them.
- If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
- If you have answered 'Yes' Patents Form 7/77 will need to be filed.
- Once you have filled in the form you must remember to sign and date it.
- For details of the fee and ways to pay please contact the Patent Office.

DUPLICATE

6712GB:ME

- 1 -

VISUAL INFORMATION SYSTEMS

The present invention relates to visual information systems.

Advertising is often presented in illuminated form consisting of an array of fluorescent lights. Such lights are usually switched on during the hours of darkness. The array occupies the same area as the image presented and consumes relatively large amounts of energy. Such systems are relatively inflexible in as much as the whole array needs to be rebuilt to display another image.

Other arrays of moving images are known in which an array consisting of a plurality of rows and columns of light sources are individually energisable to produce, for example, a moving message. Such arrays have several times more columns of light source than rows. Also, the size of the array is the same size as the image and consequently the wiring of individual light sources to the controlling circuitry and the complexity of the control circuitry are likely to be very costly.

It is an object of the invention to provide an improved visual information system.

According to the present invention there is provided a visual information system comprising an array consisting of a plurality of individually and selectively energisable light sources arranged in rows and columns, a memory for storing a program representative of a predetermined image, a controller actuatable to control the selection and sequence of energisation of the light sources within a predetermined time span in accordance with the predetermined program stored on the memory so that a viewer observing the array and being carried past the array at a predetermined speed will observe immediately following said predetermined time span the said predetermined image as an apparently stationary image occupying an area substantially larger than the area of

6712GB:ME

- 2 -

said array.

A visual information system embodying the invention will now be described, with reference to the accompanying diagrammatic drawings, in which:

5 Figure 1 is a front elevation of the system;
 Figure 2 is a block diagram of the system; and
 Figure 3 is a more detailed block diagram of the system.

10 The visual information system to be described is arranged to be located in tunnels through which public transportation vehicles such as tube trains normally run. The system consists of a series of light source arrays 2 arranged at spaced intervals along the track 4 on the side wall of the tunnel, generally level with the windows of
15 the train so that the arrays can be viewed by the passengers in the train. A sensor 6 located upstream of each array 2 is responsive to the approach of the train to the array to actuate the array. Another sensor 8 located downstream of each array is responsive to when the train
20 has passed to deactivate the array 2. The sensors 6 and 8 may take the form of infrared transmitter and receiver pairs.

 Each array 2 consists of four columns and sixty four rows of individually and selectively energisable
25 light sources for example light emitting diodes.

 Selected light sources in the array are switched ON and OFF by a controller 10 in accordance with a predetermined program stored in a memory 12. The controller is triggered by the sensor 6 and the program is
30 cyclically repeated until a signal is received from the sensor 8.

 The switching rate of the light sources and the duration of their energisation is such that a passenger sitting in the train and keeping his eyes directed at the
35 array will observe an image several times wider than the

- 3 -

The effect is achieved because with light flashes of very short duration, the reaction of the human eye to the flash persists long after the flash has finished. Thus, where a series of very short flashes occur over a short time span less than 0.015 seconds, all the flashes appear to the eye to have occurred at the same time and when the flashes are spaced from one another on the retina because the viewer has moved relative to the array, the eye perceives a composite light pattern which will persist for a short while immediately following the time span. It will thus be appreciated that a program can be created and stored in the memory 12 which will produce almost any desired image for the observer. The image may take the form of alpha numeric information or may take the form of an advertising poster.

As can be seen, the array 2 consists of a series of light emitting diodes 20. In this arrangement only sixteen are shown, arranged in a single column. Each LED has a power output of 32 mcd's and has a high switching speed with a switching time faster than 10 nanoseconds.

The CPU 26 is triggered into action by a signal received on terminal 28 from the sensor 6.

35 The CPU cyclically repeats the program stored in the EPROM 12 at a repetition rate in the range of from 10-50 Hz but is preferably 15 Hz.

6712GB:ME

- 4 -

By updating the memory periodically the passengers will be able to observe different images.

When a large plurality of arrays are provided they can be divided into groups with the memory of the system in each group being updatable simultaneously. A
5 central computer (not shown) is provided to store a plurality of different programs. The central computer is connected to each group to update the memory in each group with a new program depending either upon the time of day
10 or the location of the group.

When a colour image is required, each light source of the array can be replaced by a row consisting of red, green and blue elements or a row consisting of red, green, blue and white light elements. Each element is
15 selectively energisable. It will be appreciated that by having the program determine, the period of energisation of each light source, the shade of colour in the final image can be varied as required.

While the rows and columns in each memory can be
20 varied, it is preferable that the ratio of rows to columns in the array is 16:1 or greater.

6712GB:ME

- 5 -

CLAIMS

1. A visual information system comprising an array consisting of a plurality of individually and selectively energisable light sources arranged in rows and columns, a memory for storing a program representative of a predetermined image, a controller actuatable to control the selection and sequence of energisation of the light sources within a predetermined time span in accordance with the predetermined program stored on the memory so that a viewer observing the array and being carried past the array at a predetermined speed will observe immediately following said predetermined time span the said predetermined image as an apparently stationary image occupying an area substantially larger than the area of said array.
2. A system according to Claim 1, including sensing means for monitoring the passage of a carrier carrying said viewer past the array to trigger said controller into action.
3. A system according to Claim 2, wherein said sensing means comprises infrared sensing means arranged to activate said controller upon the approach of said carrier to the array and to deactivate the controller upon the departure of said carrier away from said array.
4. A system according to Claim 3, wherein the sensing means comprises a first infrared transmitter and receiver pair located upstream of the array and a second infrared and transmitter pair located downstream of the array.
5. A system according to any preceding claim, wherein the controller is arranged to cyclically repeat the energisations specified by the predetermined program at regular intervals.
6. A system according any preceding claim, wherein the array consists of light sources of different colours

6712GB:ME

- 6 -

and wherein the predetermined program specifies different durations of energisation of the different coloured light sources.

5 7. A system according any preceding claim, wherein said controller is arranged to complete one cycle of the predetermined program within a period of 0.015 seconds.

8. A system according to any preceding claim, wherein the ratio of rows to columns in the array is 16:1 or greater.

10 9. A system according to Claim 1, wherein each light source comprises a light emitting diode and the controller includes a driver for driving each light emitting diode, the driver being arranged to vary the period for which its corresponding diode is energised in
15 accordance with the program stored in the memory.

10. An arrangement comprising a plurality of systems each according to any preceding claim and a main computer arranged to store a plurality of different programs each representing a respective image, said main computer being
20 operable to replace the program stored in said memories with a program stored in said main computer.

11. An arrangement according to Claim 10, wherein said main computer is programmed to replace the program stored in selected ones of the memories in accordance with
25 the time of day.

12. An arrangement according to Claim 10 or Claim 11, wherein the computer is programmed to replace the program stored in selected ones of the memories in accordance with the location of their associated arrays.

30 13. A visual information system substantially as hereinbefore described, with reference to the accompanying drawings.

6712GB:ME

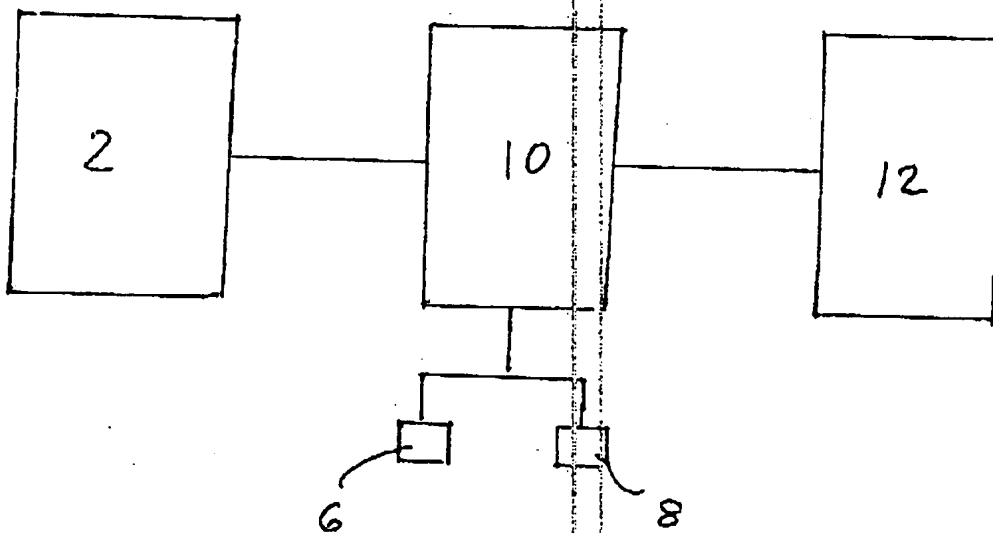
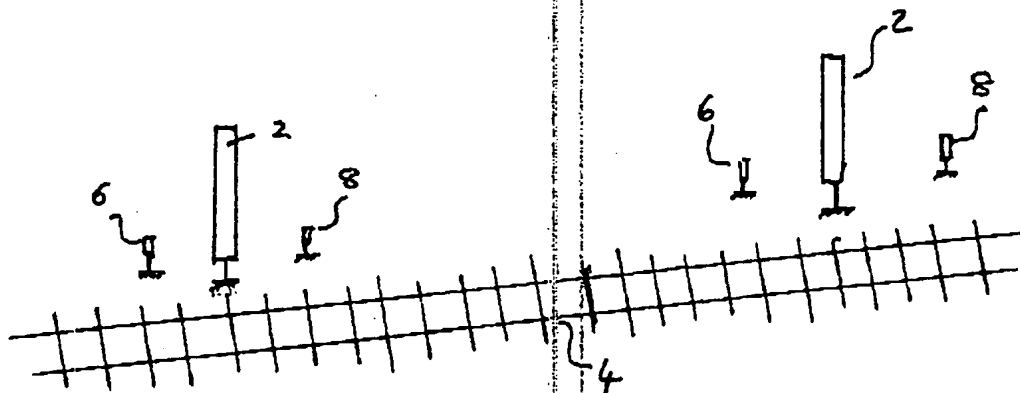
- 7 -

ABSTRACTVISUAL INFORMATION SYSTEMS

5 A visual information system includes an array
(2) of light emitting elements located at the side of a
train track (4). The elements are individually
energisable by a controller (10) in response to a
predetermined program stored in a memory (12) and
representative of a predetermined visual image. The
controller (10) causes selected elements to be turned ON
10 and OFF, some repetitively, in a predetermined sequence as
dictated by the program with a time span of 0.015 seconds.
A sensor (6) activates the controller (10) upon the
approach of a train so that a passenger gazing at the
array (2) as the train passes will perceive the said image
15 apparently extending over an area substantially greater
than the area of said array (2).

20 (Figure 1)

1/2



NOT TO BE USED

2



TOTAL P.013

INTERNATIONAL SEARCH REPORT

Inter nal Application No
PC1/GB 97/00096

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G09F19/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 G09F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| A | DE 24 61 140 B (A. WEINGARTNER) 4 December 1975 see the whole document --- | 1-15 |
| A | EP 0 390 749 A (INNOVAZIONE) 3 October 1990 see the whole document --- | 1-15 |
| A | GB 2 241 813 A (G. HELCKE) 11 September 1991 see the whole document ----- | 1-15 |

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- * & * document member of the same patent family

Date of the actual completion of the international search

3 April 1997

Date of mailing of the international search report

09. 04. 97

Name and mailing address of the ISA
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+ 31-70) 340-3016

Authorized officer

Gallo, G

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 97/00096

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---------------------|----------------------------|---------------------|
| DE 2461140 B | 04-12-75 | DE 2461140 A | 04-12-75 |
| EP 390749 A | 03-10-90 | NONE | |
| GB 2241813 A | 11-09-91 | NONE | |

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☒ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☒ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☒ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☒ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:**

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.